Agilent T-1 3/4 (5 mm), T-1 (3 mm), High Intensity, Double Heterojunction AlGaAs Red LED Lamps

Data Sheet

HLMP-D101/D105, HLMP-K101/K105

Description

These solid state LED lamps utilize newly developed double heterojunction (DH) AlGaAs/GaAs material technology. This LED material has outstanding light output efficiency over a wide range of drive currents. The color is deep red at the dominant wavelength of 637 nanometres. These lamps may be DC or pulse driven to achieve desired light output.

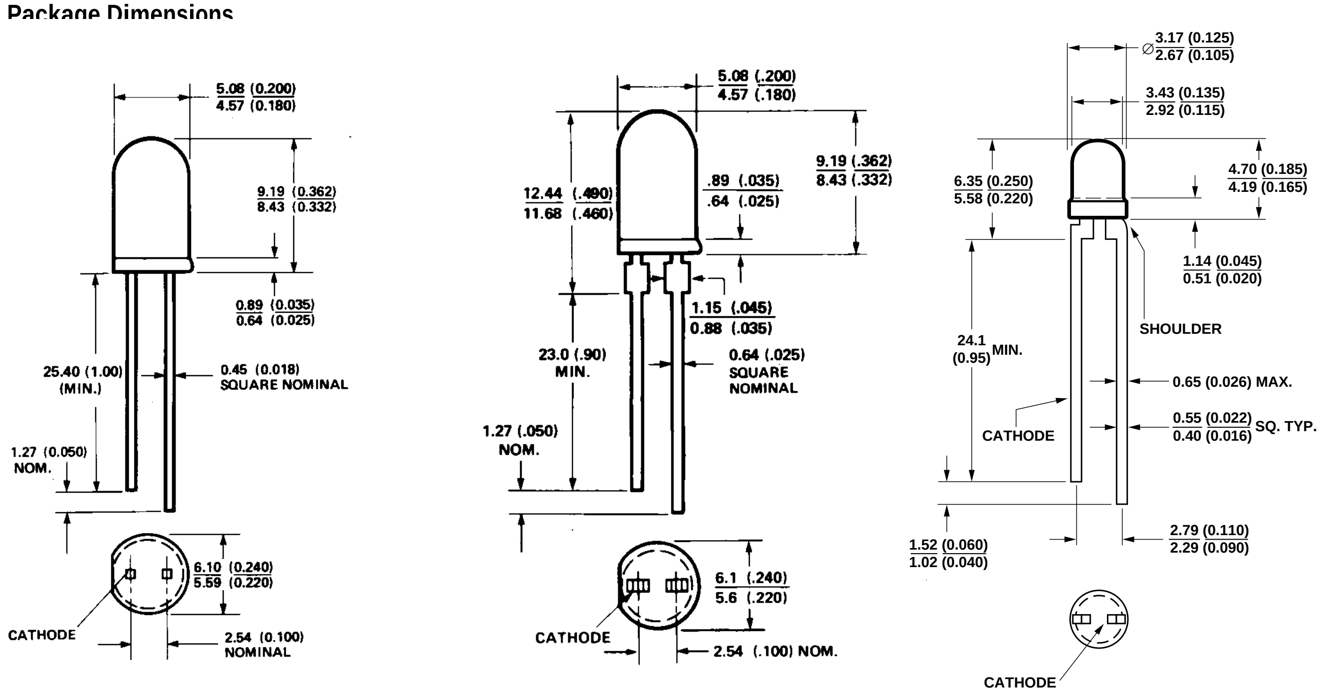
Features

- Exceptional brightness
- Wide viewing angle
- Outstanding material efficiency
- Low forward voltage
- CMOS/MOS compatible
- TTL compatible
- Deep red color

Applications

- Bright ambient lighting conditions
- Moving message panels
- Portable equipment
- General use

Package Dimensions



A B C

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES (INCHES).
2. AN EPOXY MINISCUS MAY EXTEND ABOUT 1 mm (0.040") DOWN THE LEADS.

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Selection Guide

Package Description	Device HLMP-	Luminous Intensity Iv (mcd) at 20 mA Min.	Typ.	Max.	$2\theta_{1/2}$[1] Degree	Package Outline
T-1 3/4 Red Tinted Diffused	D101	35.2	70.0	–	65	A
	D101-J00xx	35.2	70.0	–	65	A
	D101-JK0xx	35.2	70.0	112.8	65	A
T-1 3/4 Red Untinted Non-diffused	D105	138.0	240.0	–	24	B
	D105-M00xx	138.0	240.0	–	24	B
	D105-NO0xx	200.0	290.0	580.0	24	B
T-1 Red Tinted Diffused	K101	22.0	45.0	–	60	C
	K101-100xx	22.0	45.0	–	60	C
	K101-IJ0xx	22.0	45.0	70.4	60	C
T-1 Red Untinted Non-diffused	K105	35.2	65.0	–	45	C
	K105-J00xx	35.2	65.0	–	45	C
	K105-KL0xx	56.4	110.0	180.4	45	C

Note:
1. $\theta_{1/2}$ is the off axis angle from lamp centerline where the luminous intensity is 1/2 the on-axis value.

Part Numbering System

HLMP - x x xx - x x x xx

Mechanical Option
00: Bulk
01: Tape & Reel, Crimped Leads
02: Tape & Reel, Straight Leads
A1: Right Angle Housing, Uneven Leads, T1
A2: Right Angle Housing, Even Leads, T1
B1: Right Angle Housing, Uneven Leads, T-1 3/4
B2: Right Angle Housing, Even Leads, T-1 3/4
DD, UQ: Ammo Pack

Color Bin Options
0: Full Color Bin Distribution

Maximum Iv Bin Options
0: Open (no max. limit)
Others: Please refer to the Iv Bin Table

Minimum Iv Bin Options
Please refer to the Iv Bin Table

Lens Type
01: Tinted, Diffused
05: Untinted, Nondiffused

Color Options
1: AlGaAs Red

Package Options
D: T-1 3/4
K: T-1

Absolute Maximum Ratings at T_A = 25°C

Parameter	Value
Peak Forward Current[1,2]	300 mA
Average Forward Current[2]	20 mA
DC Current[3]	30 mA
Power Dissipation	87 mW
Reverse Voltage (I_R = 100 μA)	5 V
Transient Forward Current (10 μs Pulse)[4]	500 mA
LED Junction Temperature	110°C
Operating Temperature Range	-20 to +100°C
Storage Temperature Range	-55 to +100°C
Wave Soldering Temperature [1.59 mm (0.063 in.) from body]	250°C for 3 seconds
Lead Solder Dipping Temperature [1.59 mm (0.063 in.) from body]	260°C for 5 seconds

Notes:
1. Maximum I_{PEAK} at f = 1 kHz, DF = 6.7%.
2. Refer to Figure 6 to establish pulsed operating conditions.
3. Derate linearly as shown in Figure 5.
4. The transient peak current is the maximum non-recurring peak current the device can withstand without damaging the LED die and wire bonds. It is not recommended that the device be operated at peak currents beyond the Absolute Maximum Peak Forward Current.

Electrical / Optical Characteristics at T_A = 25°C

Symbol	Description	Min.	Typ.	Max.	Unit	Test Condition
V_F	Forward Voltage		1.8	2.2	V	I_F = 20 mA
V_R	Reverse Breakdown Voltage	5.0	15.0		V	I_R = 100 μA
λ_p	Peak Wavelength		645		nm	Measurement at Peak
λ_d	Dominant Wavelength		637		nm	Note 1
$\Delta\lambda 1/2$	Spectral Line Halfwidth		20		nm	
τ_S	Speed of Response		30		ns	Exponential Time Constant, e^{-t}/T_S
C	Capacitance		30		pF	V_F = 0, f = 1 MHz
$R\theta_{J\text{-}PIN}$	Thermal Resistance		260[3] 210[4] 290[5]		°C/W	Junction to Cathode Lead
η_V	Luminous Efficacy		80		lm/W	Note 2

Notes:
1. The dominant wavelength, λ_d, is derived from the CIE chromaticity diagram and represents the color of the device.
2. The radiant intensity, I_e, in watts per steradian, may be found from the equation $I_e = I_V/\eta_V$, where I_V is the luminous intensity in candelas and η_V is luminous efficacy in lumens/watt.
3. HLMP-D101.
4. HLMP-D105.
5. HLMP-K101/-K105.

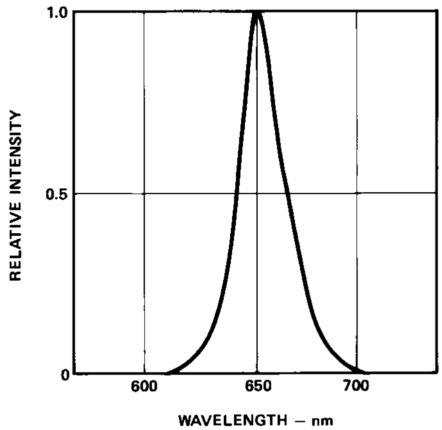


Figure 1. Relative intensity vs. wavelength.

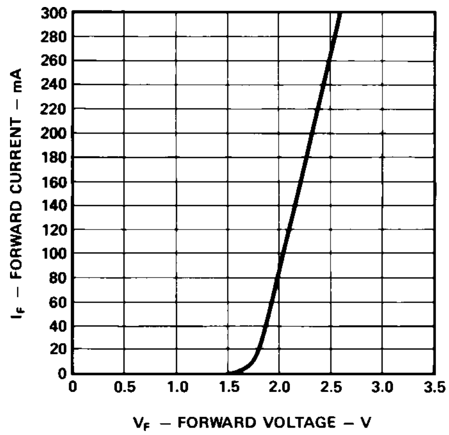


Figure 2. Forward current vs. forward voltage.

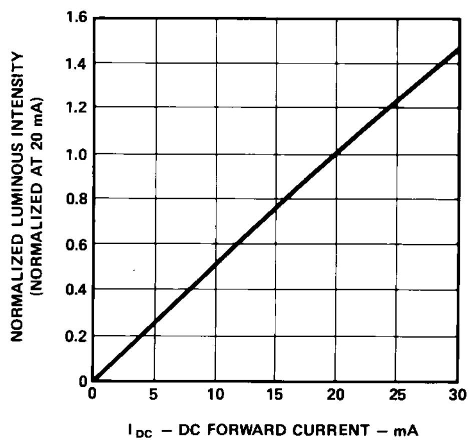


Figure 3. Relative luminous intensity vs. dc forward current.

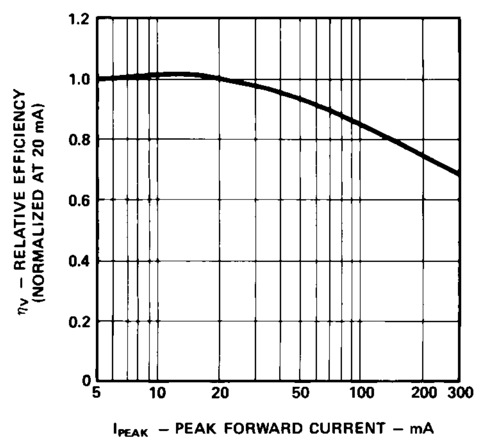


Figure 4. Relative efficiency vs. peak forward current.

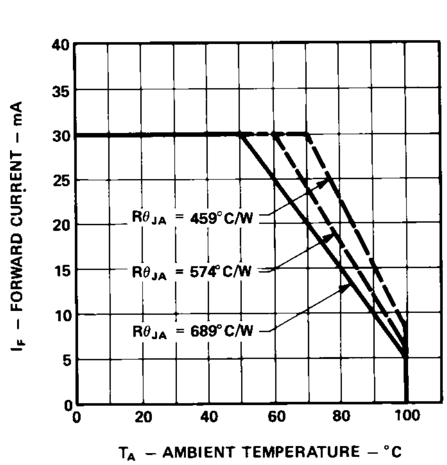


Figure 5. Maximum forward dc current vs. ambient temperature. Derating based on T_J MAX. = 110°C.

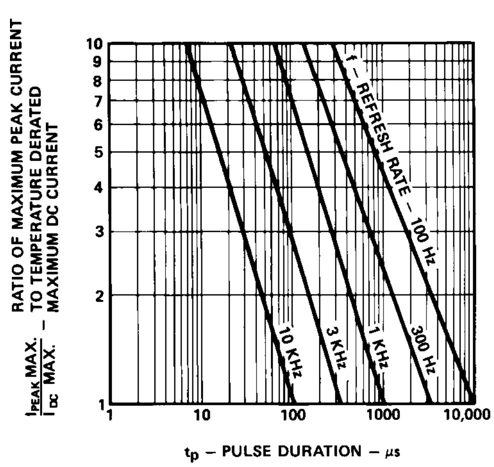


Figure 6. Maximum tolerable peak current vs. peak duration (I_{PEAK} MAX. determined from temperature derated I_{DC} MAX.).

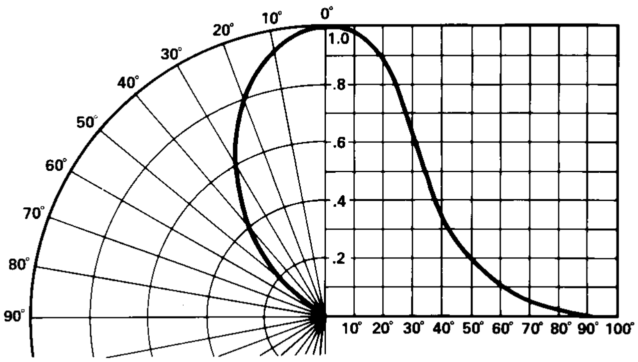


Figure 7. Relative luminous intensity vs. angular displacement. HLMP-D101.

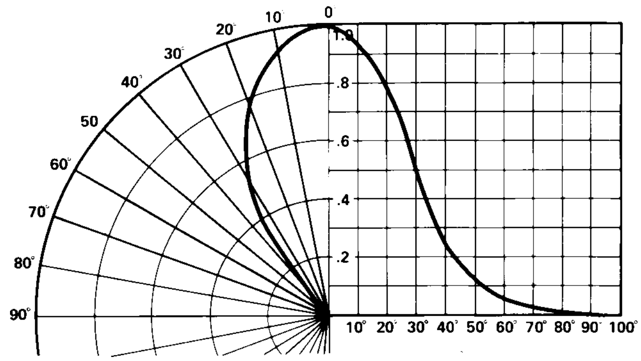


Figure 8. Relative luminous intensity vs. angular displacement. HLMP-K101.

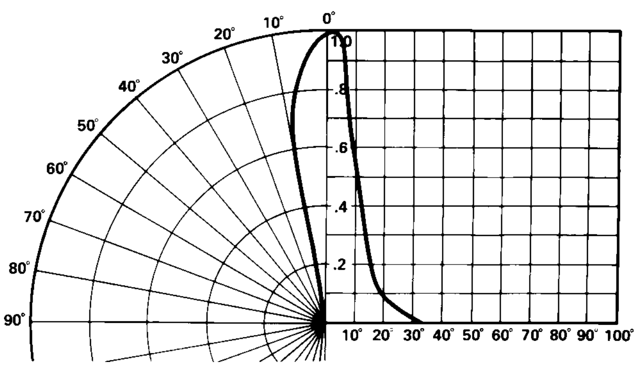


Figure 9. Relative luminous intensity vs. angular displacement. HLMP-D105.

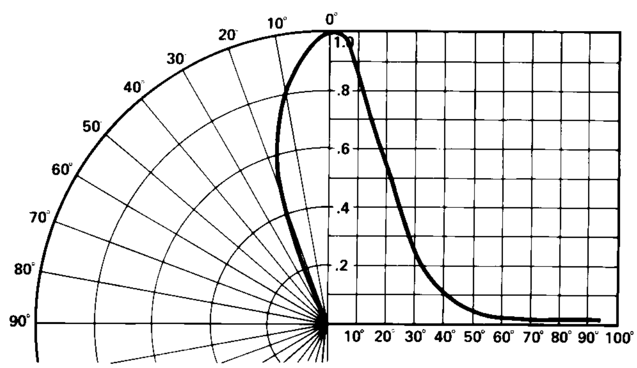


Figure 10. Relative luminous intensity vs. angular displacement. HLMP-K105.

Intensity Bin Limits

Color	Bin	Intensity Range (mcd) Min.	Max.
Red	I	24.8	39.6
	J	39.6	63.4
	K	63.4	101.5
	L	101.5	162.4
	M	162.4	234.6
	N	234.6	340.0
	O	340.0	540.0
	P	540.0	850.0
	Q	850.0	1200.0
	R	1200.0	1700.0
	S	1700.0	2400.0
	T	2400.0	3400.0
	U	3400.0	4900.0
	V	4900.0	7100.0
	W	7100.0	10200.0
	X	10200.0	14800.0
	Y	14800.0	21400.0
	Z	21400.0	30900.0

Maximum tolerance for each bin limit is ± 18%.

Mechanical Option Matrix

Mechanical Option Code	Definition
00	Bulk Packaging, minimum increment 500 pcs / bag
01	Tape & Reel, crimped leads, minimum increment 1300 pcs (T-1 3/4) / 1800 pcs (T-1)
02	Tape & Reel, straight leads, minimum increment 1300 pcs (T-1 3/4) / 1800 pcs (T-1)
A1	Right Angle Housing, uneven leads, minimum increment 500 pcs / bag
A2	Right Angle Housing, even leads, minimum increment 500 pcs / bag
B1	Right Angle Housing, uneven leads, minimum increment 500 pcs / bag
B2	Right Angle Housing, even leads, minimum increment 500 pcs / bag
DD	Ammo Pack, straight leads in 2K increment
UQ	Ammo Pack, horizontal leads in 2K increment

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Data subject to change.

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